Community Water Fluoridation is a Public Health Issue

Tooth decay affects all age groups. Although preventable, it is the most common chronic disease of childhood.[1] Untreated decay can lead to pain and tooth loss and is associated with difficulty eating, sleeping and learning, and poor nutrition.[1] An estimated 51 million school hours are lost due to cavities each year, and almost one-fifth of all health care spending for children are related to dental care.

Benefits of Fluoridation

Fluoride added to community drinking water at the proper concentration prevents tooth decay and benefits everyone in the community, regardless of age or income–including those who do not have access to prevention and treatment services.

A recent study by the Task Force on Community Preventive Services–an independent, non-federal task force–found a 30 percent decrease in childhood tooth decay in communities with fluoridated water. Stopping fluoridation was associated with an increase in tooth decay.[2] Adults in fluoridated areas had 27 percent fewer dental cavities than those in non-fluoridated areas.[3]

Cost and Savings

Water fluoridation prevents cavities and saves money, both for families and the health care system. In communities with more than 20,000 residents, every dollar spent on fluoridation on average saves $38 in avoided dental bills. In communities with 5,000 or fewer residents, every dollar spent of fluoridation still saves $5 in avoided dental bills. Over a lifetime, the cost of fluoridation can be less than the cost of one dental filling.[4] Fluoride tablets and drops, rinses and toothpastes are more expensive and less effective than the fluoridation of drinking water.[5]

Addressing Safety Concerns

Fluoride is naturally present in water and food. In Vermont, it is not uncommon to have naturally-occurring fluoride at 0.2 to 0.5 milligrams per liter of water (mg/L). In some areas, well testing has shown levels of fluoride in the same range used for community water fluoridation, and in other areas test results have been much higher.

Fluoridation of community drinking water involves adjusting the existing natural fluoride concentration in drinking water to a level that is recommended for preventing tooth decay.

The Centers for Disease Control & Prevention, the U.S. Surgeon General, and the Vermont Department of Health support fluoridation of public water supplies because of the public health benefits–while recognizing the possible risks of ingesting too much fluoride.

Recommended Fluoride Concentration

For Vermont, the fluoride concentration in water recommended for preventing tooth decay is 1 mg/L. The Vermont Department of Health monitors all water systems that add fluoride to assure that the concentration is in the range of 0.8 to 1.2 mg/L.

The federal drinking water standard (maximum contaminant level or MCL) for fluoride in drinking water including naturally-occurring fluoride is 4 mg/L. This is to prevent Stage III skeletal fluorosis, a crippling bone and joint condition. EPA has also set a (non-enforceable) standard called a secondary maximum contaminant level for fluoride, including naturally-occurring fluoride. This standard of 2 mg/L of fluoride in water was set to reduce the cosmetic effects on teeth from enamel fluorosis, which is a discoloration or pitting of teeth.

March 2010

Risks associated with fluoride at 1 mg/L

A systematic review by the University of York, UK assessed the evidence for possible ill effects from fluoridated water. This review did not find a causal association between fluoride in drinking water at 1 mg/L and severe enamel fluorosis, skeletal fluorosis, bone fractures or bone cancer. Water fluoridation is associated with increased occurrence of milder forms of enamel fluorosis.[6] Enamel fluorosis that can result from drinking fluoridated water appears as a barely noticeable white marking of the outer tooth enamel that is of no cosmetic or functional significance.
In the 2002-2003 *Keep Smiling Vermont Oral Health Survey*, 96 percent of first through third graders had no obvious signs of fluorosis.[7] Water fluoridation is not the only risk factor for mild fluorosis. Other risk factors are use of fluoridated toothpaste by young children and dietary supplements.[8] Fluoride toothpaste is not recommended for use by children under age 2 without consulting a dentist.

The Vermont Department of Health has concluded that the known benefits of fluoride to prevent or reduce tooth decay and dental fillings outweigh the risk of milder forms of fluorosis. Fluorosis is not considered an adverse health effect by public health agencies.

Naturally-occurring fluoride in Vermont

Naturally occurring fluoride levels of 4 mg/L or more have been found in private wells in Vermont. In fluoridated public water systems, the concentration used is 1.0 mg/L. Because of high levels of fluoride may be present in private wells, the Vermont Department of Health works with physicians and dentists to encourage families with small children to test for fluoride before prescribing fluoride supplements. Fluoride testing is also included in Kit C, a standard water test for private wells, available at the Health Department Laboratory. Vermont residents who use the Health Department Laboratory and have a test result over 2 mg/L of fluoride are given information about how to reduce fluoride levels in their drinking water.

Preventing enamel fluorosis

An excessive amount of fluoride consumed during tooth development in infancy and childhood can result in a range of changes to the enamel surface of the tooth, broadly termed "enamel fluorosis." Ingestion of fluoride toothpaste and inadvertent use of fluoride tablets in fluoridated areas have been associated with increased risk for enamel fluorosis. Some reports have also raised concern that the amount of fluoride in water used for mixing infant formula may add to the possibility of developing enamel fluorosis. The Vermont Department Health concurs with the CDC that water fluoridated at the optimal level has not been shown to cause adverse health effects. The Department of Health also recommends that infant formula NOT be mixed with fluoridated water to reduce the risk of mild dental fluorosis.[9]

References

[1] US Dept. of Health & Human Services, National Institute of Dental and Craniofacial Research. Oral Health in America: A report of the Surgeon General. Rockville, MD: US Dept. of Health & Human Services, National Institute of Dental & Craniofacial Research, 2000.
[2] Truman BI, Gooch BF, Sulemana I, et al. and the Task Force on Community Preventive Services. Review of evidence on interventions to reduce dental caries, oral and pharyngeal cancers, and sports-related craniofacial injury. American Journal of Preventive Medicine. 2002. 23(1S) 1-84.
[3] Griffin SO, et al. Effectiveness of Fluoride in Preventing Caries in Adults. Journal of Dental Research. 2007: 86: 410-415.
[4] Griffin SO, Jones K, Tomar SL. An Economic Evaluation of Community Water Fluoridation. Journal of Dental Public Health. 2001: 61(2): 78-86.
[5]Kumar JV, Moss ME. Fluorides in Dental Public Health Programs. Dent Clin N Am. 2008: 52: 387-401.
[6] McDonagh MS, Whiting PF, Wilson PM, Sutton AJ, Chestnutt I, Cooper J et al. (2000). Systematic review of water fluoridation. BMJ 321(7265):855-859.
[7]VT Dept. of Health. 2003-2003 Keep Smiling Vermont Oral Health Survey. http://healthvermont.gov/pubs/dental/02-03OralHealthsurvey.pdf<http://healthvermont.gov/pubs/dental/02-03OralHealthsurvey.pdf>
[8]Kumar JV, Swango PA. Fluoride exposure and dental fluorosis in Newburgh and Kingston, New York: Its implications for policy. Community Dent Oral Epidemiol 1999;27:171-80.
[9]VT Dept. of Health. Fluoridated Water and Infant Formula. http://healthvermont.gov/family/dental/fluoride/formula.aspx

VERMONT
DEPARTMENT OF HEALTH